

**What is claimed is:**

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1. A thermal sensor in an integrated circuit comprising:  
  
a register to hold a response of said thermal sensor; and  
  
an Input/Output (I/O) interface to receive an input trigger to trigger  
said response of said thermal sensor and to communicate an indicator that said  
thermal sensor is sensing the temperature of said integrated circuit followed  
by said response of said thermal sensor held by said register and a value  
generated by said thermal sensor that indicates said thermal sensor is  
functioning properly.
  2. The thermal sensor of claim 1, wherein said Input/Output interface comprises  
a digital Input/Output interface.
  3. The thermal sensor of claim 2, wherein said digital Input/Output interface  
comprises at least two electrical contacts.
  4. The thermal sensor of claim 3, wherein a first of said at least two electrical  
contacts receives said input trigger to trigger said response of said thermal sensor.
  5. The thermal sensor of claim 3, wherein a second of said at least two electrical  
contacts communicates said response of said thermal sensor held by said register.
  6. The thermal sensor of claim 1, wherein said integrated circuit comprises a  
microprocessor.
  7. The thermal sensor of claim 1, wherein said integrated circuit comprises a  
very large scale integration (VLSI) circuit.

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8. The thermal sensor of claim 1, wherein said thermal sensor appends said value to said response of said thermal sensor.

9. The thermal sensor of claim 1, wherein said thermal sensor is a calibrated  
5 sensor.

10. The thermal sensor of claim 1, wherein said thermal sensor is an active sensor.

11. In an integrated circuit having a thermal sensor, a method for said thermal  
10 sensor to provide an indication that said thermal sensor is functioning properly, the method comprising the steps of:

asserting an input signal at a first Input/Output pin of said thermal  
sensor to initiate thermal sensing of said integrated circuit by said thermal  
sensor;

15 sensing by said thermal sensor a temperature of said integrated circuit;  
and

asserting an output signal on a second Input/Output pin of said thermal  
20 sensor by said thermal sensor at completion of said step of sensing, wherein  
said output signal provides said temperature of said integrated circuit and  
provides said indication that said thermal sensor is functioning properly.

12. The method of claim 11 further comprising the step of writing said  
25 temperature of said integrated circuit to a register of said thermal sensor.

13. The method of claim 11, further comprising the step of asserting a status  
signal on said second Input/Output pin of said thermal sensor during said step of  
sensing by said thermal sensor a temperature of said integrated circuit to indicate that  
30 said sensing is occurring.

14. The method of claim 11, wherein said output signal comprises a first portion and a second portion.

5 15. The method of claim 14, wherein said first portion of said output signal comprises a value representative of said temperature of said integrated circuit.

16. The method of claim 14, wherein said second portion of said output signal comprises a value representative of said indication that said thermal sensor is  
10 functioning properly.

17. The method of claim 15, wherein said value representative of said temperature indicates an absolute temperature.

18. The method of claim 15, wherein said value representative of said temperature indicates a relative temperature.

19. A thermal sensor in an integrated circuit that reports a status value, a response value and a self-test value comprising:

20 a serial interface having at least one input contact and one output contact, wherein assertion of a control signal on said input contact triggers said thermal sensor to report said status value, said response value and said self-test value on said output contact.

25 20. The thermal sensor of claim 19 comprises an active thermal sensor.

21. The thermal sensor of claim 19, wherein said response value comprises an absolute temperature value.

30 22. The thermal sensor of claim 19, wherein said response value comprises a relative temperature value.

23. The thermal sensor of claim 19, wherein said status value indicates that said thermal sensor is obtaining said response value.

24. The thermal sensor of claim 19, wherein said self-test value indicates  
5 functionality of said serial interface.

25. In a very large scale integration (VLSI) circuit a method for reporting a temperature sensed by a thermal sensor of said VLSI circuit comprising the steps of:

10 triggering said thermal sensor to sense said temperature of said VLSI circuit;

affixing a value to said temperature sensed by said thermal sensor to  
form a response; and

15 transmitting said response from said thermal sensor.

26. The method of claim 25, further comprising the step of determining from said response an operational state of said thermal sensor.

20 27. The method of claim 26, wherein said affixed value indicates said operational state of said thermal sensor.

28. The method of claim 26, wherein said response is transmitted to an integrated  
25 circuit external to said VLSI circuit.

29. The method of claim 25, further comprising the steps of reporting a status by said thermal sensor while said thermal sensor senses said temperature of said VLSI circuit.